



ETH zürich



Assessment of Alternative Phosphorus Fertilizers for Organic Farming: Sewage Precipitation Products

The application of sewage sludge to agricultural land is currently prohibited in organic farming due to the risk of soil contamination from harmful compounds. Incineration or disposal to landfill of sludge is costly, leads to increased greenhouse gas emissions, and neglects the possibility of nutrient recovery. There are various technologies to recover P by crystallization or precipitation from waste water and sewage sludge. Depending on the input material, nutrient concentrations and concentration of contaminants can vary widely. Regarding the content of potentially toxic elements, the trade-offs between (potentially) toxic element concentrations and potential benefits may be more favorable for treated sewage products than for several natural phosphate rocks or even animal manures or bio-waste compost. This fact sheet describes the most important aspects to assess the suitability of sewage sludge precipitation products for use in organic farming.

Introduction

Phosphorus (P) in sewage sludge accounts for a significant portion of the potential P resources for recycling in European societies, e.g. more than 50% of the non-agricultural sources in Germany^[1]. Consequently, several pioneers of organic farming at the beginning of the 20th century based their fertilization strategy on recycling of urban organic wastes including human feces^[2].

Currently the use of sewage sludge is forbidden in organic farming^[3] because of the risk of contamination by toxic elements and other harmful substances including human pathogens and drug resi-

dues^[4]. The decision not to use sewage sludge as a fertilizer has unintended consequences in terms of increased greenhouse gas (GHG) emissions from sludge incineration, higher disposal costs, loss of nutrients like nitrogen (N), P and potassium (K), and loss of organic matter^[5, 6].

Separation of P and other plant nutrients like N, magnesium (Mg) and K by precipitation or crystallization may be an option to recover purified P and recycle it, with reduced risks for contamination compared with applying sewage sludge directly to the soil.